SOUTH AFRICAN COMMERCIAL FISHERIES REVIEW ~ 1997

MARINE AND COASTAL MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM
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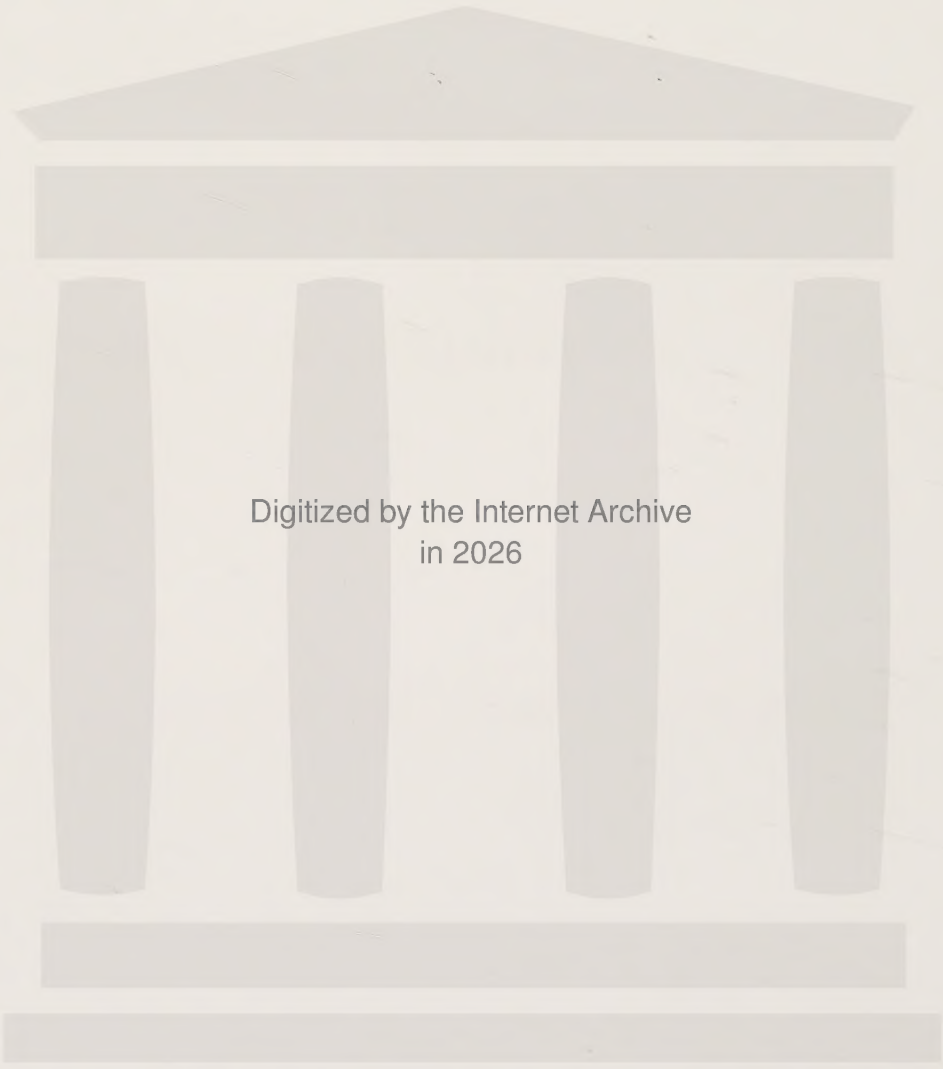
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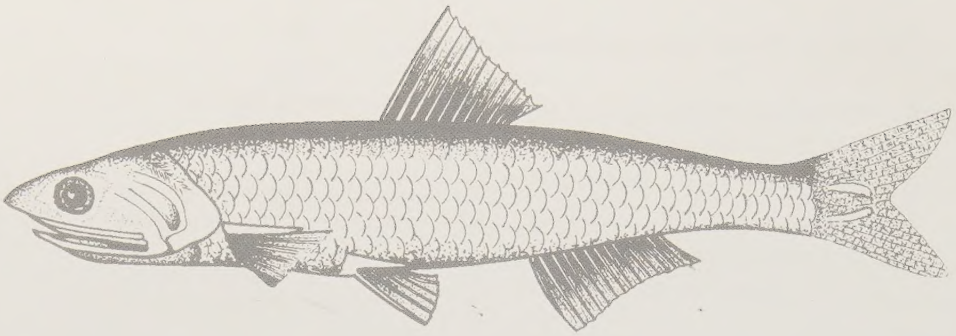
The text was compiled by the editor from contributions by the relevant directorates, subdirectorates and divisions of Marine & Coastal Management, based largely on statistics and information rendered by the fishing industry.



MISSION OF MARINE AND COASTAL MANAGEMENT

To provide for responsible custodianship of South Africa's marine and coastal resources and ecosystems for the benefit of current and future generations of South Africans. This is achieved by the conservation of such resources and ecosystems through the control of, and the orderly, fair and equitable access to, their optimum sustainable utilization. Activities are undertaken in accordance with national and international norms, and are:

- carried out under the auspices of the Department of Environmental Affairs and Tourism in an open, cooperative and accountable manner, subject to Government policy, and
- based on rigorous, multidisciplinary research and monitoring aimed at developing a comprehensive understanding of relevant resources and ecosystems as well as of relevant industries and communities.

EDITORIAL NOTE

The South African Commercial Fisheries Review aims to present the official statistics on the catches, production and monitoring of the South African commercial marine fisheries sector. It also documents changes in legislation, exploited stocks, fishing practices, processing and marketing trends and in fisheries management. More detailed descriptions of the scientific research that is undertaken by Marine and Coastal Management is presented in Research Highlights, the companion series to this one.

Marine and Coastal Management (M&CM) is the new name for Sea Fisheries, which was amalgamated with the Subdirectorate: Coastal Management early in 1999.

1. INTRODUCTION

The year 1997 was an important one for the South African fishing industry. For the first time the value of South African fisheries products broke the R2 billion barrier and a Marine Fisheries Policy - which set out the Government's main policy principles with respect to the management of fisheries - was tabled in Parliament.

The White Paper on Marine Fisheries Policy prescribes a fundamental restructuring of the South African fishing industry. The Policy is based on the recommendations of the Fisheries Policy Development Committee, a body that consulted widely with members of the fishing industry, government and other interest groups over a period of 18 months.

The controversial issue of access to South Africa's living marine resources forms the crux of the White Paper which advocates a system whereby fishers will be invited to bid for, and so obtain real, long-term rights to catch so-called quota species such as hake, rock lobster and abalone. The White Paper proposes that these rights be transferable and inheritable and that attempts be made to extend such rights to non-quota species such as squid and linefish. The new access scheme should favour small- to medium-sized enterprises and provide incentives to large fishing enterprises to restructure their ownership and achieve empowerment objectives.

Against the backdrop of increasingly strident calls for the transformation of the South African fishing industry, catches in most sectors remained stable. Notable exceptions were the abalone and linefish sectors where illegal harvesting and over-exploitation of resources were matters of concern for fisheries managers.

In the demersal fishing sector, South Africa's most valuable commercial fishery, catches remained stable, though hake catches fell from their 1996 five-year high of 153 686 t. The two-year experimental longline fishery for hake was concluded at the end of 1997. One of the findings of the experiment is that the impact of longlining on the spawner stock is relatively low when compared to trawling. However, the combined effect of longlining and trawling could have a substantial impact on the spawner population.

Catches in the West Coast rock lobster sector improved, owing to an increased Total Allowable Catch (TAC). However, in April and May, after the main fishing season, a major stranding of rock lobster occurred at Elands Bay and almost 2 000 t of mainly undersized animals washed onto beaches. The so-called rock lobster "walkout" was in response to low oxygen conditions that resulted from the decay of a dense algal bloom. Subsequent surveys indicated that few rock lobsters had survived the incident.

In the abalone fishery reduced abalone densities were recorded in the Hermanus to Hawston area, resulting in a cut to the TAC for this region. Illegal fishing continued in this zone and appeared to be spreading to other areas, specifically the remote area near Buffeljags and the marine reserve at Betty's Bay.

Poor catch reporting, particularly in the harder and St Joseph fishery continued to concern researchers and managers in the linefish sector. For the first time in this series of reports, catches of the larger pelagic species, such as tuna and billfish, as well as sharks, are recorded under a separate sub-heading.

The number of vessels participating in the squid jigging fishery continued to drop as improvements were made to the fishing fleet. Smaller squid boats are gradually being replaced by larger boats with freezing capabilities.

Six vessels fished for Patagonian toothfish around the South African-owned Prince Edward Islands in 1997. Illegal fishing by unlicensed operators continued to pose a threat to this species which is known to be slow growing.

The moratorium on seal harvesting imposed by the Minister of Environmental Affairs in July 1990 remains in place and no seal products were exported from South Africa in 1997. No seabird guano has been exported from South Africa since 1992. As a result, these two sectors are no longer included in this series of reports.

2. THE FISHERY AS A WHOLE

2.1 Total catch

Catch statistics for the 1997 fishing year are presented in Table 1. The total catch for 1997 amounted to 534 626 t, an increase of 16% over the total catch for 1996. Improved catches in the pelagic sector were largely responsible for the increase in the total catch. However, the total catch for 1997 still fell short of the record 592 561 t that were landed in 1995.

The demersal sector's catch of 201 951 t was slightly higher than the 1996 catch of 201 412 t, although catches of Cape hakes fell from their 1996 five-year high of 153 686 t to 143 054 t. The catches of hake made by participants in the hake longline experiment were slightly lower than those made in 1996 and amounted to 4 478 t.

Catches made by the pelagic fishing sector improved in 1997 after the poor 1996 fishing season. However, the 1997 catch of 286 436 t was still significantly smaller than the catches made by the pelagic fishing sector in 1994 and 1995. It should be noted that small pelagic species, such as anchovy and pilchard, are notoriously susceptible to changes in environmental conditions and it is not unusual for catches of these species to fluctuate dramatically from year to year.

Landings of rock lobsters increased slightly in 1997 owing to an increase in the West Coast rock lobster TAC. The TAC for South Coast rock lobster was lowered to 415 t tail mass for the 1997 fishing season.

Abalone catches fell by 12% owing to a 50% reduction in the TAC for Zone C (Hermanus- Hawston). Clear indications of resource denudation were recorded from this zone and it is apparent that several years of intense poaching activity have begun to impact on the commercial fishery for abalone.

In the linefish sector catches fell to 23 927 t in 1997. In KwaZulu-Natal and the former Transkei catches of traditional linefish species fell by 23% but in the remainder of the country catches increased marginally to 12 559 t. Squid catches were noticeably reduced, falling from 7 107 t in 1996 to 3 891 t.

The catch statistics presented throughout this report are a summation of the monthly landings reported by South African fishing companies. As such they are regarded as being quite accurate, particularly in the case of fisheries controlled by TACs; namely the demersal, pelagic, rock lobster and abalone sectors. For fisheries in which the catch is not always landed in the whole state, particularly the demersal fisheries, landings have been converted to nominal catch by the use of scientifically determined conversion factors. For the smaller fisheries, for which the number, rather than the mass of fish caught, is reported, a conversion to mass has been made using the best available information. This applies to the mullet and oyster fisheries in particular.

The monetary values presented in Table II are an estimate, based on the average prices realized by fishing companies throughout the year. The production figures that are presented in this report are also supplied by the fishing industry.

TABLE I

Total nominal catch and catch per sector of the South African commercial marine fisheries.

	Nominal catch (t)	
Fishery sector	1996	1997
Seaweeds (wet weight)	12 913	15 452
Bait organisms	1.5	1.7
Prawns, mussels and oysters farmed/fattened	2 951	2 563
Picked oysters and marketable wash-ups	92	112
Abalone	613	537
Whelks and crabs	-	-
Periwinkles	-	-
Rock lobster fisheries		
West Coast	1 517	1 680
South Coast	435	415
Subtotal rock lobster	1 952	2 095
Crustacean trawl	330	393
Pelagic fisheries	213 669	286 436
Line fisheries		
Large pelagics*	5 811	6 970
Squid jigging	7 107	3 891
Handline fishery	12 841	13 066
Subtotal linefish	25 759	23 927
Harder and St Joseph fishery	1 235	1 158
Demersal fisheries		
Offshore	170 722	167 030
Inshore	16 407	15 148
Midwater	8 688	15 291
West Coast sole	16	4
West Coast gurnard	119	-
Longline experiment	5 460	4 478
Subtotal demersal	201 412	201 951
Total	461 028	534 626

* Tuna, billfish and sharks

2.2 Monetary value of catches and products

The monetary value of South Africa's commercial fishing industry broke the R2 billion barrier for the first time in 1997. This was a milestone for the industry which, though regionally important, is a relatively small contributor to the country's Gross Domestic Product. A continued decline in the local currency supported export sales which amounted to approximately 50 % of production.

Most sectors of the fishery showed an increase in value, largely because of the growth of export markets. These gains offset the decrease in TAC for sectors such as abalone and South Coast rock lobster.

The demersal sector remained stable and continued to perform well, despite industrial unrest and increasingly strong calls for the sector to transform and make way for new entrants. Increased earnings of R104 million were therefore an important achievement for the demersal fishery.

The pelagic fishery continued to grow. An increase in earnings of R74 million demonstrated that the fishery had begun to recover from the low catches of 1996.

The popularity of South African rock lobster products in Europe and the Far East was responsible for an increase in value of R9 million in the West Coast rock lobster sector. However, increased activity by poachers threatened to undermine these gains.

The South Coast rock lobster sector experienced a poor fishing season in 1997. Catches were poor and the sector was forced to make large investments in boats and

TABLE II

Estimated values of landings and products of the various South African commercial fisheries.

	Value (R)	
	Free on board (F.O.B.) value	
Fishery sector	1996	1997
Seaweeds	5 073	4 971
Mariculture (mussels, oysters, prawns, abalone)	31 958	41 392
Oysters collected	1 014	1 202
Abalone	56 677	79 433
Rock lobster fisheries		
West Coast	102 217	111 409
South Coast	71 038	55 612
Subtotal rock lobster	173 255	167 021
Crustacean trawl	12 641	12 484
Pelagic fishery	365 942	439 224
Linefisheries		
Tuna pole fishery	12 897	26 471
Squid-jigging	156 332	91 464
Handline fishery	93 153	96 983
Subtotal linefish	262 382	214 918
Mullet and St Joseph fishery	4 006	4 785
Demersal fisheries		
Offshore and Midwater	924 013	989 744
Inshore	76 493	68 736
Demersal longline	39 976	46 373
Subtotal demersal fish	1 040 482	1 104 853
Total	1 953 430	2 070 283

equipment in order to stay competitive. Earnings by the South Coast rock lobster sector decreased by R16 million during 1997.

The linefish sector also showed a drop in earnings during 1997, largely owing to the over-exploitation of certain traditional linefish species, but also because the squid fishery's earnings declined by R65 million. It is hoped that the introduction of new conservation measures for the linefishery will lead to the recovery of over-exploited species.

The importance of mariculture to the South African fishery became more apparent in 1997 with earnings from this sector growing by R10 million. This trend is largely due to the growth of the abalone culture industry – a sector which requires large investments but which promises high returns.

In general, prospects for the South African fishery continued to improve, largely owing to the growth in export markets. However, the fishing industry will only benefit from the strong demand for South African fisheries products if resources are managed well.

2.3 The South African commercial fishing fleet

A total of 4 661 vessels were licensed for commercial fishing during the 1996/97 season (Table III). This is 224 fewer vessels than were registered in the 1995/96 fishing season. The sudden drop in the number of vessels is explained by the fact that a new boat registration system was introduced in 1996 and, owing to a loophole in the

TABLE III: Licensed South African commercial fishing vessels for the 1996/97 fishing season

Registration area	Registration code	5m	5-8m	8-12m	12-20m	20-25m	>25m	Regional totals
Lambert's Bay	ADF	194	24	35	5	7	0	265
Bredasdorp District (including Waenhuiskrans and Struis Bay)	BR	37	124	22	1	0	0	184
Caledon and Hermanus districts (including Hawston)	C	73	53	0	2	0	0	128
Table Bay area (including Bok Bay and Yzerfontein)	CT	95	201	5	0	0	2	303
Cape Town Harbour	CTA	0	0	3	86	11	78	178
Gans Bay (including Klein Bay and Pearly Beach)	DDF	68	61	1	7	7	0	144
Durban area	DNA	0	7	13	4	2	23	49
East London area	ELA	2	21	2	1	0	0	26
George District	G	4	8	0	0	0	0	12
Humansdorp District (including Jeffreys Bay and Oyster Bay)	H	10	114	15	15	0	0	154
Hondeklip Bay	HB	42	0	0	4	0	0	46
Hout Bay	HTB	6	21	14	75	16	3	135
Kalk Bay	KB	7	24	36	9	1	0	77
Knysna District (including Plettenberg Bay)	KN	13	61	5	10	0	0	89
Mossel Bay	MBA	4	26	16	22	19	3	90
Kwazulu-Natal coast	N	17	176	9	0	0	0	202
Port Alfred District	P	6	91	14	3	0	0	114
Port Elizabeth area	PEA	8	56	15	100	19	16	214
Port Nolloth	PNA	146	5	0	4	1	0	156
Piketberg District (including Elands Bay and Velddrif)	PQ	347	50	3	4	11	3	418
Riversdale District (including Still Bay and Puntjie)	R	36	129	2	0	0	0	167
Saldanha Bay area	SBH	212	85	10	15	11	35	368
Vredenburg District (including Paternoster and St. Helena Bay)	SH	313	76	26	13	21	12	461
Heidelberg District (including Witsand and Infanta)	SM	8	24	0	0	0	0	32
Simonstown area (including Cape Point & False Bay areas)	ST	126	158	0	0	0	0	284
Simonstown Harbour	STH	4	3	6	4	0	0	17
Somerset West District (including Gordons Bay)	SW	73	137	12	5	0	0	227
Vredendal District (including Doring Bay)	VR	115	1	1	4	0	0	121
Total 1996/97		1 966	1 736	265	393	126	175	4 661
Total 1995/96		2 022	1 865	284	404	133	177	4 885

new system, many boatowners were able to split their semi-commecial (B) and tuna (T) fishing permits between two vessels. This had the effect of inflating the number of fishing vessels that were active in the 1995/96 fishing season.

The boat registration system was amended during the 1996/97 season. This had the effect of reducing the number of licensed vessels to a level which is consistent with levels recorded prior to 1996. (For example, a total of 4 673 vessels were licensed in the 1994/95 fishing season.)

As in previous years, during the 1996/97 season, the majority of fishing vessels (79%) measured 8m or less and were used predominantly in the rock lobster, abalone, linefish and mullet fisheries. A total of 124 vessels were licensed as factory vessels, one fewer than in the 1995/96 season.

3. FISHERY SECTORS

3.1 Seaweeds

Seaweeds are collected from many areas of the South African coast between the former Transkei and the Northern Cape. The main commercial activities are the harvesting of *Gelidium* species in the Eastern Cape, the collection of beach-cast kelp in the Western and Northern Cape provinces, limited kelp harvesting in the Western Cape, and collection of beach-cast *Gracilaria* at Saldanha Bay.

The harvests of the agar-producing *Gelidium* species from the Eastern Cape remained fairly stable in 1997. This genus of red seaweeds produces a very high quality of agar, and is also sought after as a food in the East. Nevertheless, the South African material must compete against other *Gelidium* species for a share of the Eastern market, and fluctuations in yields often reflect collecting effort, rather than the availability of the resource.

Collections and exports of beach-cast kelp (*Ecklonia maxima* and *Laminaria pallida*) exceeded 1 800 t (Table IV), reflecting an exceptionally high demand for these South African seaweeds. This kelp is processed for the extraction of alginate (a gelling agent and emulsifier with many applications in the food and chemical industries), and the market is strongly affected by the availability of kelp from China and Chile. In 1996 and 1997 unfavourable weather conditions greatly reduced kelp production in those countries and improved the market for the South African material.

The kelp *Ecklonia maxima* is harvested at Kommetjie on the Cape Peninsula, to produce a high-value plant growth stimulant. This product has been comprehensively researched, and shows a steady increase in international sales. Limited amounts of kelp are also harvested at several sites along the coast, for feeding to cultivated abalone. Although the quantities are at present very small, they will increase significantly as abalone farms increase in size and begin to operate at full commercial production levels. Abalone farmers obtain the kelp via arrangements with the concession-holders, and either harvest it themselves or buy freshly-cut material from the concessionaires.

The beach-casts of the red seaweed *Gracilaria* increased at Saldanha Bay during 1997, after a fall in 1996. The biomass of the natural population of *Gracilaria* fluctuates widely, so that yields of beach-cast material vary from year to year, making the mariculture of this species an attractive proposition. This material is dried, sorted and baled for export to the East, where it is used to produce agar, a gelling agent used widely in foods, pharmaceuticals and cosmetics.

3.2 Bait organisms

The number of active permit holders for white mussel *Donax serra* on the west coast increased from five to six in 1997. Total landings increased from 40 756 mussels in 1996 to 45 227 mussels in 1997. These mussels were sold directly to fishermen for use as bait.

One permit was issued for the harvesting of red bait *Pyura stolonifera* as a by-product of the mussel farming industry in the Saldanha Bay area. A total of 619.6 kg was harvested in 1997, compared with 715 kg in 1996.

3.3 Mariculture

The bulk of South Africa's mariculture production is made up of mussels, predominantly the Spanish mussel, *Mytilus galloprovincialis*. Most of the production occurs at two farms in Saldanha Bay which make use of the Spanish raft system. Annual production varies between 1 500 t and 3 000 t green weight per year. In all 1 900 t were produced in 1997.

Oyster farming is more widespread, with some 10 producers located around the coastline in Knysna, Port Elizabeth, Saldanha Bay, Paternoster, St Francis Bay, Port Alfred and Alexander Bay. During 1997, however, only eight out of the 10 companies issued with permits were active in farming oysters. Production figures for the cultivated oyster *Crassostrea gigas* totalled 4 109 493 in 1997, compared with 4.8 million in 1996 and 4.1 million in 1995. Furthermore, one company produced 671 500 seed oysters in 1997, compared with a total of 6.7 million produced by two companies in 1996.

TABLE IV: Seaweeds gathered and exported (kg dry mass)

Concession area (C.A.)	Kelp: Mixed *Ecklonia maxima* & *Laminaria* spp.		*Gelidium* spp.		*Gracilaria verrucosa*		Total	
	1996	1997	1996	1997	1996	1997	1996	1997
				Gathered				
Ciskei *	-	-	16 093	11 214	-	-	16 093	11 214
Transkei #	-	-	34 312	33 196	-	-	34 312	33 196
Transkei +	-	-	21 329	15 744	-	-	21 329	15 744
1	-	-	67 014	59 248	-	-	67 014	59 248
2	-	-	-	-	-	-		
3	-	-	-	-	-	-		
4	-	-	-	-	-	-		
5-8	286 907	530 983	-	-	-	-	286 907	530 983
9	$	&	-	-	-	-		
10	-	-	-	-	-	-		
11	-	43 656	-	-	-	-	-	43 656
12	-	75 466	-	-	-	-	-	75 466
13-14	522 729	659 939	-	-	-	-	522 729	659 939
15	396 262	259 653	-	-	-	-	396 262	259 653
16	321 416	252 010	-	-	-	-	321 416	252 010
17	-	-	-	-	189 650	266 328	189 650	266 328
Total	1 527 314	1 821 707	138 748	119 402	189 650	266 328	1 855 712	2 207 437

* Taurus Chemicals
* Taurus Chemicals

Taurus Products
+ Wild Coast Industries
$ Excludes 405 300 kg wet mass (dry mass c. 60 795 kg if 85% moisture assumed) of kelp harvested in area 9
& Excludes 326 700 kg wet mass (dry mass c. 49 005 kg if 85% moisture assumed) of kelp harvested in area 9

Note: For the purpose of managing seaweed resources, the coastline of South Africa was divided into 17 concession areas. The concession system was devised prior to 1994 and has remained in place since then. It is for this reason, as well as to ensure consistency in data collection, that the names of the areas remain as they are shown on this table.

Abalone farming has been under development in South Africa since 1990 and in 1997 several farms moved closer to the production phase. Existing permit holders for abalone culture are situated between East London on the East Coast to Port Nolloth on the West Coast. The majority of the farms are concentrated in Walker Bay on the South Coast, where the highest densities of wild abalone occur.

The farming of the giant tiger prawn, *Penaeus monodon*, the Kurama prawn *P. japonicus* and the Indian white prawn *P. indicus* began in Amatikulu and Mtunzini in KwaZulu-Natal in 1992. Since 1994 the common local species *P. indicus* has formed the basis of local mariculture production. In all, 40 t of prawns were produced in KwaZulu-Natal in 1997.

3.4 Wild oysters

The number of oysters *Striostrea margaritacea* collected from the intertidal area along the south coast by oyster pickers increased from 650 877 in 1996 to 962 113 in 1997 (Table V). Nine permits were issued to marketers working in 13 concession areas. The number of pickers issued with permits, excluding duplication between concession areas, was 57.

Oyster landings in the smaller KwaZulu-Natal fishery remained stable, with 387 200 oysters landed in 1997. In addition, 45 019 oysters were landed by the recreational fishery in KwaZulu-Natal which is a slight increase compared to the 1996 figure of approximately 41 723.

TABLE V: Commercial oyster production and marketers

Locality/Product	Number of size oysters		Number of marketers*
	1996	1997	
Natural picked and marketable "wash-ups"	650 877	962 113	13
Cultivated and fattened wash-ups			
Saldanha Bay	931 533	543 600	
Knysna	3 264 678	2 845 794	
Port Elizabeth#	210 400	234 550	
Other areas†	28 221	485 549	
Subtotal cultivated and fattened	4 434 832	4 109 493	
Total	5 085 709	5 071 606	

* Marketers involved in more than one concession area or activity were counted separately for each

\# Includes fattened wash-ups. There were 61 601 undersize wash-ups in 1997

† Port Alfred, Alexander Bay & Jacobs Bay

3.5 Abalone

In all, 57 entitlement holders (divers) participated in this fishery during the 1996/97 season and 22 participants employed assistant divers. The majority (53) of the entitlement holders delivered their abalone to 22 quota holders who processed and marketed the abalone. However, in a recent development in this fishery, four of the entitlement holders were granted the right, upon entry to the fishery, to process and market their own abalone.

Fishery independent abalone surveys (FIAS), which were initiated in 1995, continue to provide useful data on the status of the resource in the different management zones. However, assessment of the status of the resource continues to rely heavily on the catch rates of divers and the interpretation of size composition data from the seven fishing zones.

Catch and Catch Per Unit Effort (*cpue*) for each zone for the past two seasons are shown in Table VI. Zones A to D together contributed 93% of the overall TAC for the 1996/97 season. The depressed, and still declining, state of the *cpue* in zone C is apparent, with the recent reductions attributable to the effects of severe poaching in this area. A general declining trend in catch rates is apparent for the three other major zones, A, B and D.

The sharp decline in *cpue* for Dyer Island (Table VI) reflects diver behaviour rather than resource trends. This island is closed to fishing for most of the season and the conservative 25 t TAC is fished over a two-day period, after which the area is closed to fishing. This management strategy is designed to maintain above average abalone densities in this area, with the aim of supplying abalone larvae to adjacent, heavily fished coastlines.

Robben Island, which still retains accumulated abalone reserves in some areas, is similarly fished for a two-day period by only 10 divers. The two islands therefore show varying *cpue* depending on the divers involved and the sea conditions on the diving days.

The whole mass receiving quota for the 1996/97 commercial season was reduced from 613 t to 537 t because of a 50% reduction in TAC which was applied to zone C. This reduction was a response to the high illegal take which was recorded in this zone. Clear indications of resource denudation were apparent to research divers carrying out the FIAS dive and were also reflected in

Several abalone farms moved closer to the production phase in 1997.

TABLE VI

Catch and catch rate (*cpue*) for the seven abalone fishing zones for the 1995/1996 and 1996/1997 seasons

Zone	Area	Catch (t)		Catch rate (kg.diver-h^{-1})	
		1995/96	1996/97	1995/96	1996/97
A	Quoin Point – Pearly Beach	206	203	147	133
B	Franskraal – De Kelders	146	146	144	158
C	Hermanus – Hawston	130	60	84	71
D	Kleinmond – Hangklip	89	93	153	161
E	Cape Point – Mouille Point	-	-	-	-
F	Robben Island	15	14	427	309
G	Table Bay – Cape Columbine	-	-	-	-
Dyer I.	Dyer Island	26	21	186	139
	All zones	613	537	130	132

TABLE VII: Commercial production for abalone

Commodity (kg)	1995/96	1996/97
Canned products*	84 489	92 120
Frozen pieces	40 236	24 440#
Frozen whole	8 100	
Fresh/Live (in shell)	66 722	67 680
Dried abalone	221	429
Total	199 768	184 649

* To convert to whole mass, multiply canned products by 4, frozen pieces by 3, frozen whole by 1, fresh/live by 1 and dried by 10.

\# Figure includes whole frozen abalone and frozen pieces

the reduced abalone densities that were recorded on the transects.

The abalone season began 18 days late (due to conflicts within the industry) on 18 November 1996 and was extended by four months to 30 November 1997. At the start of the season the Minister of Environmental Affairs and Tourism held back 150 t of the TAC for the purpose of allocating it to new entrants. However, his decision was overturned by a court ruling and the TAC was re-allocated to existing participants. For a second year abalone divers managed their own inter-area schedule, whereby each diver was assigned a percentage of each zonal TAC. In previous years problems arose when divers rushed to fill their individual entitlements in the most favoured fishing zones.

Live abalone constituted a significant part of the export market and a small quantity of dried abalone was exported by the fishing industry (Table VII).

Poaching continues to pose a threat to the abalone resource and, in 1997, illegal fishing continued and spread to other areas – specifically Buffeljags (zone A) and within the marine reserve at Betty's Bay. Measurements of confiscated abalone showed that a high proportion of poached abalone was undersize. This means that many abalone are removed from the population before attaining sexual maturity and the loss of egg production will negatively influence the sustainability of present harvest levels.

In an attempt to curtail the expansion of the recreational fishery, the season was reduced from nine to six months. Because the reduction was applied to a period of the year which is unfavourable for diving, it had no effect. In fact, recreational effort continued to increase, with 35 215 permits being sold, the maximum number ever recorded. Results of the annual telephonic survey showed that a total of 492 t of abalone were landed by recreational divers for the six month season. It would seem that a further reduction of access time is required if the impact of the recreational sector is to be reduced.

3.6 Periwinkles

An experimental permit was issued for the harvesting of *Turbo cidaris* and *Oxystele sinensis* east of Cape Hangklip in 1995. Owing to the fact that only small samples were harvested for marketing purposes, the permit was withdrawn. However, a researcher from the University of Cape Town continued to collect samples with a view to determining the biology, morphology and population estimates of the top shells.

TABLE VIII

Permits for jigging (C), processing (F) and transporting (X) squid issued to licensed South African commercial fishing vessels during the 1996/97 fishing season. Also shown are the number of restricted permits (R) issued and the numbers of licensed crew in each region

Registration area*	C	Crew	F	Crew	X	Crew	R#	Crew
CTA	0	0	22	975	0	0	0	0
HTB	16	305	13	281	0	0	0	0
KB	1	24	1	25	0	0	26	250
DDF	2	42	3	75	0	0	0	0
R	0	0	0	0	0	0	0	0
MBA	1	26	1	26	0	0	3	24
G	0	0	0	0	1	4	0	0
KN	5	55	2	35	1	4	1	14
H	34	342	5	120	16	56	0	0
PEA	82	1 457	73	1 552	3	12	0	0
P	3	35	1	20	1	4	17	127
ELA	1	22	1	28	0	0	0	0
SH	1	20	0	0	0	0	0	0
SBH	0	0	2	47	0	0	0	0
Totals	146	2 328	124	3 184	22	80	47	415
Total squid permits	339							
Total crew	6 007							

* The registration codes are explained in Table III on p.4

\# Restricted permit-holders are limited to certain areas and catch squid for bait purposes

3.7 Cephalopods

South African research on the life cycle of the squid is world renowned. This was one of the conclusions of the International Symposium on Cephalopods (CIAC '97) which was held in Cape Town in September 1997. However, in South Africa, the management of the squid-jigging fishery is fairly primitive. Owing to the fact that squid *Loligo vulgaris reynaudii* are a short-lived species, and because the fishery is dominated by small businesses that make use of small vessels, the fishery is effort regulated.

Frozen squid *Loligo vulgaris reynaudii* is exported to European markets.

One of the most important regulatory measures for the management of the squid-jigging fishery is the closed season which takes effect between October 25 and November 22 each year. Although the role of the closed season in curtailing effort has been found to be relatively small (about 9%), its main advantage is the protection it affords squid spawning aggregations. The closed season therefore secures the successful reproduction of the species for the benefit of future generations.

To date the fairly primitive management measures which are applied to the squid-jigging fishery have succeeded in ensuring fairly stable catches - except in *El Niño* years when catches drop, mainly due to squid unavailability. During the 1997 fishing season *El Niño*-related climatic conditions negatively impacted on the jig fishery and catches dropped from 7 107 t in 1996 to 3 891 t (Table IX).

The number of vessels participating in the jig fishery continued to drop in 1997, from about 240 boats to 210 boats. This trend is, however, not a sign of decreasing effort, but rather an indication of improvements to the fishing fleet: smaller boats are being replaced by larger boats with freezing facilities. Catch methods are also

TABLE IX

Squid catches (t) by various sectors of the fishery

Sector	1996	1997
South African trawl		
Red squid	34	59
White squid (chokka)	384	237
Subtotal trawl	418	296
Crustacean trawl	*	2
Jigging	7 107	3 891
Octopus trawl	#	64
Total all sectors	7 525	4 253

* Less than 0,5 t
\# Figure not available

TABLE X

Cephalopod catches (kg) off KwaZulu-Natal by the East Coast crustacean fishery

Species	1996	1997
Squid	320	1 651
Octopus	11 470	9 539
Cuttlefish	10 070	9 437
Total	21 860	20 627

improving with squid being preserved in accordance with international standards.

In 1997 the largest squid catches were made in December and October, and there were signs of excellent availability during November when the fishing season was closed. The best fishing areas were Port Alfred (804 t) and Port Elizabeth (855 t).

The trawl bycatch of squid continued to decrease, from 384 t in 1996 to 237 t in 1997. However, the bycatch of red squid *Todaropsis eblanae* and *Todarodes angolensis* increased from 34 t to 59 t. Octopus bycatch, recorded for the first time in this series of reports, was 64 t.

The total bycatch of cephalopods in the East Coast crustacean fishery dropped slightly, from 21.9 t in 1996 to 20.6 t in 1997. However, Indian Ocean luminous squid *Loligo duvauceli* catches increased, from 0.3 t to 1.7 t. Catches of both octopus and cuttlefish were smaller during 1997 (Table X).

3.8 Crustaceans

3.8.1 West Coast rock lobster

Following the low somatic growth rates of West Coast rock lobster *Jasus lalandi* during the late 1980s and early 1990s, the results of growth studies for the 1995/96 season were more optimistic. This trend continued in the 1996/97 season. As could be expected, increased growth resulted in greater population productivity, which translated into higher catch rates from both the fishery independent monitoring survey and the commercial fishery. This was reflected by the TAC, which increased from 1 520 t in 1995/96 to 1 680 t for the 1996/97 season, an increase of 10.5%. A further consequence of improved population productivity was that the lobster were in good condition.

Despite increased productivity, *cpue* continued to decline in Areas 5 and 6 following the black tide that occurred in St Helena Bay during 1994. In fact, catches were so poor that only 56% of the areal allocation could be landed there, with the remainder being transferred to Areas 7 and 8, where catch rates were substantially higher. However, at Elands Bay, which is located immediately north of Area 5, *cpue* continued to improve, with the result that most (91%) of the Zone B allocation was landed there. To the north of Elands Bay, catches followed the pattern of decline observed in previous years.

These trends confirmed that resource productivity was being concentrated in the southern portion of the West Coast; this was also reflected by patterns in the recreational fishery. Recreational catches increased significantly from 380 t to 496 t, with most (55%) of the lobster being landed in the area east of Cape Hangklip and a further 22% taken in Area 8, the Cape Peninsula.

Unfortunately, in April and May, after the main fishing season, a major stranding of rock lobster occurred at Elands Bay (Area 4). Almost 2000 t of mainly undersized animals washed onto beaches in response to low oxygen conditions that resulted from the decay of a dense algal bloom. Subsequent surveys indicated that few lobsters survived.

Comparative market sales figures for the 1995/96 and 1996/97 fishing seasons indicate that sales of frozen tails continued to decline in favour of whole raw frozen products, sales of which increased by 300%. Sales of cooked frozen rock lobsters also declined during the 1996/97 season, but sales of live rock lobsters remained stable at around 500 t (Table XII).

TABLE XI: Actual catches of West Coast rock lobster in 1995/1996 and 1996/1997 and Total Allowable Catches for the 1995/1996 and 1996/1997 seasons per fishing zone.

Area	Number	Zone	Actual catch (t)		TAC (t whole)	
			1995/1996*	1996/1997	1995/1996	1996/1997
Port Nolloth Hondeklip Bay	1 2	A	30	29	30	33
Lamberts Bay Elands Bay	3 4	B	13 360	17 370	368	408
St Helena Bay Saldanha Bay	5 6	C	14 40	38	60	66
Dassen Island Cape Peninsula Hout Bay	7 8 10	D	267 745 30	318 857 29	265 747 30	293 827 30
False Bay	11	E	18	22	20	23
Total			1 517	1 680	1 520	1 680

* Updated

TABLE XII

Sales of West Coast rock lobster products

Commodity (kg as specified)	Mass (kg)	Price (R/kg)	1997 (R'000)	1996 (R'000)
Frozen tails	6 247	142.2	888	4 395
Whole frozen, cooked	544 106	78.34	42 625	48 762
Whole frozen, raw	348 549	70.59	24 604	7 869
Live	490 788	88.21	43 292	41 191
Total			111 409	102 217

3.8.2 South Coast rock lobster

The TAC for South Coast rock lobster *Palinurus gilchristi* was set at 415 t tail mass for the 1996/97 season. This included a 2 t allocation for research purposes. The lowering of the TAC by 12 t, from the figure set for the 1995/96 season, was in line with a strategy, agreed upon during the 1994 stock assessment, to gradually reduce the TAC for South Coast rock lobster. The smaller TAC for the 1996/97 season should therefore be seen as a continuation of this strategy, although the size of the reduction in TAC was smaller than the 25 t cuts which were implemented in previous years. The rationale for cutting the TAC by a smaller margin was that changes in the fishing strategy during the early 1990s may have affected the abundance index on which the assessment relied. These changes included an increase in the number of traps used in the fishery, as well as an increase in trap-soaktimes, essentially from overnight sets to sets of 48 hours and longer (Table XIII). This increase in effort has raised concerns that effort saturation effects may reduce catch-per-trap, leading to an underestimation of actual abundance. An effort reduction experiment to investigate the relationship between effort and abundance is planned.

TABLE XIII

Effort, catch and *cpue* in the South Coast rock lobster fishery

	Effort (24hr sets)	Effort (48hr sets)	Catch (tons tails)	*cpue* (kg.trap-day^{-1})
1994/1995	1 552	345	452	0.13
1995/1996	1 300	512	427	0.13
1996/1997	1 095	939	415	0.11

TABLE XIV Production of South Coast rock lobster commodities

Commodity (kg as specified)	Mass (kg)	Price (R/kg)*	1997 (R' million)	1996 (R'million)
Frozen tails	264 519	137 (190)	36.2	47.7
Whole frozen, raw	83 780	67 (73)	5.6	10.6
Live	183 460	75 (87)	13.8	12.8
Total			55.6	71.1

* Quoted price is 1997 rate with 1996 rate in brackets

Rock lobster products sold at a significantly lower price on international markets in 1997 than in 1996 (Table XIV). The total income from this sector therefore declined from R 70.8 million in 1996 to R 55.6 million in 1997. The upwards trend previously shown by the live lobster category continued in 1996/97, and live lobsters now represent 22% (by tail mass) of total sales compared with 17% in 1995/96 and 13% in 1994/95. Frozen lobster tails remain the most important product of the fishery, with a market share of 68% by mass.

TABLE XV

Landings (kg whole mass) of the East Coast crustacean trawl fishery in Kwazulu-Natal

Species	1997	1996
Inshore Prawns (Tugela prawns)	14 047	53 320
Offshore Prawns (pink prawns)	79 917	51 580
Langoustine	77 800	46 430
Shrimp	3 405	1 940
Scampi	1 371	-
Rock lobster	10 320	10 390
Slipper lobster	569	-
Inshore Crab (Tugela crab)	727	520
Offshore crab (Red crab)	112 721	82 150
Squid	1 651	320
Octopus	9 539	11 470
Cuttlefish	9 437	10 070
Mixed Fish	65 048	62 170
Total landings	386 552	330 360

3.8.3 East Coast crustaceans

The landings of the East Coast crustacean trawl fishery in KwaZulu-Natal are given in Table XV.

Langoustine catches showed a considerable increase, as did the landings of crab. White prawn catches continued to slide while pink prawn catches remained stable in relation to 1995 and 1996. A matter for concern was the low incidence of juvenile pink prawn, though experience in Moçambique shows that this factor need not necessarily have an impact on the following year's landings.

3.9 Pelagic fish

3.9.1 Catch

The 1997 pelagic fishing season was unusual when compared to previous years. Results from the November 1996 pelagic survey indicated that anchovy *Engraulis capensis* abundance was at its lowest level since these surveys began. However, pilchard *Sardinops sagax* was in a relatively healthy state, having increased steadily from the low recruitment levels of the mid-1980s.

The survey results prompted the development of a new management procedure for pilchard which assumed that no directed fishing for anchovy would take place during 1997. The procedure was not required to accommodate juvenile pilchard bycatch which occurs with anchovy directed fishing. Since the previous management procedure for pilchard had shown extreme sensitivity to the size of this bycatch, setting the latter to zero meant that the new pilchard management procedure could be more generous in terms of directed TAC. Therefore, although the 1997 pelagic fishing season started with an effective closure of the anchovy fishery (an anchovy bycatch allowance of 5000 t was set), the effects of the closure were partially compensated for by a higher pilchard directed TAC than would otherwise have been set.

Perceptions of the status of the anchovy resource

TABLE XVI

Catches (t) made by pelagic vessels in South African waters during 1996 and 1997

Month	Anchovy	Pilchard direct	Pilchard bycatch	Maas-banker	Chub mackerel	Round herring	Lanternfish	Other*	Total
January	26	555	822	170	-	13 691	23	25	15 312
February	14	6 441	2 301	364	93	14 901	30	9	24 153
March	-	9 622	1 913	373	146	21 378	14	31	33 477
April	22	11 473	1 162	313	73	19 971	118	22	33 154
May	1 196	11 830	3 023	9 343	2 678	15 364	17	82	43 533
June	758	7 053	361	377	579	759	1	23	9 911
July	20 434	13 844	2 571	900	97	887	13	48	38 794
August	10 817	9 282	3 671	521	61	1 212	-	159	25 723
September	23 174	10 860	9 331	338	1	3 302	20	29	47 055
October	3 653	5 836	1 824	29	20	714	7	2	12 085
November	-	2 673	160	-	-	26	-	-	2 859
December	-	365	15	-	-	-	-	-	380
Total (1997)	60 094	89 834	27 154	12 728	3 748	92 205	243	430	286 436
Total (1996)	40 712	76 216	28 913	18 988	1 101	47 117	33	589	213 669

* Juvenile gurnard, mantis shrimps, snoek, ribbonfish, hake and jellyfish but also small quantities of other species

TABLE XVII

Licensed South African pelagic fishing vessels for the 1996 and 1997 fishing seasons according to vessel size and cooling capacity

Registration code*	<20 m		20-30 m		>30 m		Ice		Ordinary	
	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997
ADF	–	–	7	6	–	–	3	3	4	3
CTA	1	1	2	2	–	–	3	3	–	–
C	1	1	7	–	–	–	1	1	–	–
DDF	1	1	6	7	–	–	8	8	–	–
HTB	2	2	–	5	–	–	3	3	5	7
KB	4	4	–	–	–	–	4	4	–	–
PEA	1	1	–	1	–	–	1	2	–	–
PNA	1	–	–	–	–	–	1	–	–	–
PQ	1	1	13	12	1	1	12	12	3	2
SBH	–	–	7	6	1	2	8	8	–	–
SH	1	2	23	23	8	6	23	24	7	7
Total	13	13	65	62	10	9	67	68	19	19

* The codes for registration areas are explained in Table III on p.4

changed somewhat following the midyear pelagic recruitment survey in 1997. The survey showed average anchovy recruitment and good pilchard recruitment. Calculations indicated that re-opening the anchovy fishery - while setting aside a fixed amount of the pilchard recruitment for juvenile bycatch with anchovy - would not compromise the levels of future directed fishing for adult pilchard which were anticipated by the new pilchard management procedure. The approach used was to ensure that the quanta set for an anchovy TAC, and pilchard juvenile bycatch allowance, would provide sufficiently high probabilities of achieving end-of-year target biomass levels, while reflecting the anchovy:pilchard mix observed in the recruitment survey.

TABLE XVIII: Pelagic fishing industry: production of south western Cape factories in 1996 and 1997

Company	Factory	Fishmeal (t)		Fish oil (t)		Canned fish (cartons)		Canned fish (t)#	
		1996	1997	1996	1997	1996	1997	1996	1997
Gansbaai Marine	Gans Bay	3 709	4 489	259	179	558 000	773 000	9 331	9 699
Marine Products	Laaiplek	4 104	6 425	226	171	430 000	544 000	7 596	9 672
Premier Fishing	Saldanah	6 375	8 965	552	565	373 000	583 000	6 431	10 052
West Point Processors	St Helena Bay	5 881	7 731	418	401	540 000	648 000	9 310	11 172
Oranjevis†	St Helena Bay	4 720	6 762	486	692	733 000	834 000	12 638	14 379
Oceana Fishing	St Helena Bay*	3 800	5 200	266	364	1 142 000	1 831 000	19 690	31 569
Oceana Fishing	Hout Bay*	5 400	7 300	456	637	0	0	0	0
Oceana Fishing	Lamberts Bay*	6 188	8 431	465	592	0	0	0	0
Oceana Fishing Total		5 388	20 931	1 187	1 593	1 142 000	1 831 000	19 690	31 569
Industry Total		40 177	55 303	3 128	3 601	3 776 000	5 213 000	64 996	86 543

* Estimates for fish meal and fish oil.
\# Tons caught for canning.
† Figures for Port Elizabeth are included.

The November 1997 pelagic survey confirmed the recruitment levels estimated by the preceeding recruitment survey. The final TACs for 1997 were set at 88 000 t for directed pilchard, 60 000 t for anchovy and a pilchard bycatch allowance of 50 000 t. Table XVI details actual catches in the pelagic fishery.

At 92 000 t, the round herring *Etrumeus whiteheadi* catch for 1997 was the highest ever recorded, and almost double that of 1996. Most of the round herring catch was landed during the months when no anchovy fishing was permitted.

3.9.2 Fishing fleet

A new system of boat registration was introduced in 1997. As a result, information about the pelagic fishing fleet, which has traditionally been listed in table form in this publication, has changed somewhat. Table XVII gives a breakdown of the 1997 pelagic fleet according to the area of registration and boat length. The cooling capacity of the vessels is also shown. (Figures for 1996 are presented for reference purposes).

In total, 84 pelagic vessels were licensed to fish during the 1997 season, which amounts to three fewer vessels than in 1996. As was the case in the previous fishing season, 13 of the boats were smaller than 20m. However, the number of large vessels (over 30m) decreased by one, bringing the total in this category to nine. The total number of boats with cooling facilities increased by one to 68, while those without cooling facilities decreased by four to 16.

3.9.3 Production

The production of fishmeal, fish oil and canned fish by pelagic fish processors in the south western Cape is detailed in Table XVIII.

3.10 Linefish

Altogether, 2 341 vessels, or 75% of the linefish fleet, submitted monthly catch returns to the National Marine Linefish System in 1997. These figures represent a decrease of 3% over the previous year's figures. In total, 21 254 catch returns, or 76% of the fleet's obligatory returns, were submitted. Approximately 53% of these returns showed nil performance, while the remainder reported 80 500 days fished. This is a decrease of 8% on the number of days fished during 1996. However, the national reported catch of linefish (excluding tuna and squid) increased marginally in 1997, to a total of 13 066 t. By comparison, a total catch of 12 841 t was reported in 1996. (Tables XX and XXI on p. 16 and 17).

TABLE XIX

Permits issued to licensed South African commercial (A) and semi-commercial (B) linefishing and tuna (T) fishing vessels for the 1995/1996 and 1996/1997fishing seasons*

Registration area#	A	B	T	Total
PNA	0	50	0	50
HB	0	29	0	29
VR	0	118	0	118
ADF	0	209	1	210
PQ	0	231	2	233
SH	1	169	21	191
SBH	1	140	13	154
CT	5	180	40	225
CTA	3	91	81	175
HTB	13	59	54	126
STH	1	13	8	22
STH	7	191	54	252
KB	35	24	21	80
SW	13	132	17	162
C	1	88	3	92
DDF	27	66	6	99
BR	57	79	15	151
SM	1	17	0	18
R	10	88	2	100
MBA	12	48	17	77
G	0	6	1	7
KN	6	36	3	45
H	13	49	20	82
PEA	56	74	58	188
P	17	42	6	65
ELA	4	8	3	15
DNA	6	14	1	21
N	99	24	17	140
Total 1996/97	388	2 275	464	3 127
Total 1995/96	375	2 252	495	3 122

* Boats with linefishing permits may also hold permits for other fishery sectors, e.g. squid-jigging (Table VIII) and purse-seining (Table XVIII)

\# The codes for registration areas are explained in Table III on p.4

Swordfish is processed in a Cape Town factory.

Reported catches in KwaZulu-Natal and the coastal regions of the former Transkei decreased by 23% in 1997 to 506 t. This decline in catches was reflected across all species, with the exception of geelbek *Atractoscion aequidens*, catches of which increased by 23 t. The bulk of the geelbek catch was reported from southern KwaZulu-Natal, while increased yellowtail catches were made in both KwaZulu-Natal and the former Transkei.

A marginal increase (3%) in linefish catches over the previous year to 12 559 t was recorded for the remainder of the country. Catches of yellowtail *Seriola lalandi*, carpenter *Argyrozona argyrozona* and snoek *Thysites atun*, declined by 3%, 5% and 7% respectively from the previous year to 482 t, 838 t and 6 569 t. The catch of kob *Argyrosomus inodorus* increased marginally by 2% to 677 t, while the increased availability of geelbek *Atractoscion aequidens* that was reported from KwaZulu-Natal was also recorded in the Western Cape where catches increased by 33% to 425 t.

In a complete reversal of the previous year's trend, red steenbras *Petrus rupestris* catches increased by 46% to 57 t. Catches of Roman *Chrysoblephus laticeps* dropped by 7% to 76 t and a 5% drop in red stumpnose *Chrysoblephus gibbiceps* catches, to 18 t, was recorded. Dageraad *Chrysoblephus cristiceps* catches improved by 28% to a level of 27 t.

Hottentot *Pachymetopon blochii* catches increased by 11% to 306 t, while white stumpnose *Rhabdosargus globiceps* catches decreased by 35% to 144 t. The increased availability of mackerel *Scomber japonicus* in 1997 saw the catch of this specie increase almost fivefold, from 88 t in 1996 to 417 t. The burgeoning hand-line fishery for hake continued to expand in response to the high prices paid for line-caught hake. Reported landings increased by a further 17% to 1 870 t.

Table XX compares the reported total catch of linefish in the Western Cape for the 1995, 1996 and 1997 calendar years. In order to maintain a continuous data set, the catches of the former Transkei and KwaZulu-Natal are reflected as a unit (Table XXI). Landings by fishing harbours are given in Table XXII. Ysterfontein and St Helena Bay recorded the highest landings, reporting 40% and 39% of landings at fishing harbours respectively. Lamberts Bay, Hout Bay, Arniston and Stil Bay are also important landing sites. It is unfortunate that all fishing harbours do not consistently participate in the collection of landing statistics and an important harbour such as Struis Bay is conspicuous by its total absence.

TABLE XX Total reported Cape landings (to the nearest 100kg) of linefish species (tuna excluded) by registered commercial boats in 1995,1996 and 1997

Locality	Snoek	Yellow-tail	Kob	Geelbek	Car-penter (silver-fish)	Roman	Red steen-bras	Red stump-nose	Dageraad	Seventy-four	Santer	Hottentot	Chub mack-erel
Port Nolloth	281 100	200	100									3 900	700
Doring Bay	24 400	25 600										3 000	
Lamberts Bay	182 000											16 700	
Elands Bay	185 100	100										2 600	
Laaiplek	22 500	600	100									800	
St Helena Bay	1 638 600	7 000										27 900	800
Saldanha Bay	28 800	9 600	1 700									28 200	
Yzerfontein	2 753 700	8 500				200						63 100	400
Cape Town	634 900	300	100								100	39 600	
Hout Bay	86 100	600										7 700	400
Kommetjie	195 900	17 400			100	1 300						46 700	1 000
Kalk Bay	122 700	1 400	19 800	3 200	3 200	5 900		200				14 200	1 100
Gordon's Bay	8 700	3 700	21 700	45 000	4 800	15 000	100	400				18 500	500
Hermanus	1 000	200	3 200	600	4 400	1 000						2 900	7 400
Gans Bay	2 100	75 500	30 300	38 000	60 100	11 900	300	3 400				29 500	141 700
Struis Bay	48 800	220 400	60 800	111 900	293 600	13 600	9 700	1 500	100		1 800	1 100	59 600
Arniston	350 500	74 700	20 700	32 300	177 600	1 000	28 700	200			4 300		16 700
Stil Bay		500	179 000	4 100	10 900	4 400	200	300	100		3 900		2 200
Mossel Bay		100	70 800	1 300	20 300	4 300	300	2 900	100		2 600		10 100
Plettenberg Bay	2 500	11 200	16 800	47 600	39 300	1 700	1 800	300			400		145 200
Jeffrey's Bay		1 200	15 300	19 400	41 000	3 200	2 300	800	2 300		2 800		13 500
Port Elizabeth		12 000	60 000	51 100	98 400	8 500	1 600	1 800	7 500		8 100		12 700
Port Alfred		10 900	171 800	59 200	70 200	4 100	1 200	5 400	12 900		8 400		2 400
East London		100	5 100	11 400	14 200	200	10 800	300	3 600	1 300	1 800		100
Total 1997	6 569 400	481 800	677 300	425 100	838 100	76 300	57 000	17 500	26 600	1 300	34 200	306 400	416 500
Total 1996	7 007 800	493 700	658 200	317 900	877 900	81 500	39 300	18 700	21 100	2 200	39 700	274 000	87 900
Total 1995	9 174 400	768 700	645 900	289 400	746 800	67 000	49 100	14 500	16 900	2 300	33 000	248 300	94 400

* Mainly baardman, blue hottentot, butterfish, flathead, fransmadam, gurnard, jacopever, kingklip, knifejaw, maasbanker, rock-cod, seacatfish (barbel), steentjie and wrec

TABLE XXI: Total reported catch (to the nearest 100kg) of line-fish species by registered commercial boats fishing in the former Transkei and KwaZulu-Natal in 1996 ar

Locality 1996 (updated)	Kobs*	Geelbek	Slinger	Santer	Blueskin	English-man	Scots-man	Emperor	Seventy-four	Red steenbras	Unspecific redfish**	m
Former Transkei	800	1 800	17 400	1 400	2 100	4 600	4 700	1 100	600	2 600	4 100	
Southern KZN	28 200	49 100	67 700	16 400	9 100	22 700	8 000	2 300	1 800	1 000	2 600	2
Northern KZN	32 800	15 100	92 400	35 700	16 800	3 500	100	300	400		800	1
Total	61 800	66 000	177 500	53 500	28 000	30 800	12 800	3 700	2 800	3 600	7 500	3

Locality 1997 (updated)	Kobs*	Geelbek	Slinger	Santer	Blueskin	English-man	Scots-man	Emperor	Seventy-four	Red steenras	Unspecific redfish**	m
Former Transkei	300	800	2 400	1 500	900	1 500	600	100	500	2 600	3 300	
Southern KZN	25 500	70 300	36 500	11 900	5 000	17 400	3 800	1 700	600	1 000	1 900	
Northern KZN	25 100	18 100	82 000	27 700	11 100	2 900	200	400	200		2 800	1
Total	50 900	89 200	120 900	41 100	17 000	21 800	4 600	2 200	1 300	3 600	8 000	2

* Includes kob and squaretail kob ** Includes dageraad, Dane and king soldier

Mainly sea catfish (barbel), German, grunter, kingfish, rubberlip, carpenter (silverfish), blue hottentot, dolphinfish, yellowfin tuna and unspecified fish species

Sharks	Panga	White stump-nose	Elf	Hake	Others*	Total
100					100	286 200
						53 000
					2 100	200 800
					2 100	189 900
					100	24 100
900					6 800	1 682 000
1 900		100 600	700		12 500	184 000
800				300	300	2 827 300
500	200				1 500	677 200
800					200	95 800
6 100	1 500	100		1 400	2 300	273 800
11 200	6 900	32 800	2 800	600	5 600	231 600
7 500	2 500	7 100	6 400	3 500	6 000	151 400
500	1 200			100	300	22 800
72 300	700	1 600	200	700	12 300	480 600
64 300	1 600	400	1 400	5 400	1 800	897 800
61 500				2 200	300	770 700
60 300	200	500	300	91 800	1 700	360 400
52 900	500	900	100	547 100	4 600	718 900
4 100	21 800		100	943 800	15 400	1 252 000
	24 700		300	140 100	600	267 500
1 000	36 600		2 400	88 900	1 900	392 500
	60 600		400	44 400	10 500	462 400
400	4 400			100	2 500	56 300
347 100	163 400	144 000	15 100	1 870 400	91 500	12 559 000
225 600	108 600	219 900	34 800	1 590 700	85 200	12 184 700
298 100	98 000	125 300	43 000	756 300	89 200	13 560 600

Queen mackerel	Yellowtail	Poenskop (Black musselcracker)	Rock-cods	Others#	Total
	800	2 700	7 600	11 300	63 600
200	1800	3 800	18 500	67 300	323 300
1 400	100	2 100	32 900	21 100	268 600
1 600	2 700	8 600	59 000	99 700	655 500

Queen mackerel	Yellowtail	Poenskop (Black musselcracker)	Rock-cods	Others#	Total
	1 200	1 300	2 100	6 500	25 600
900	3 100	2 100	12 800	34 500	237 000
1 000	1 300	2 100	29 000	28 900	244 800
1 900	5 600	5 500	43 900	69 900	507 400

3.11 Large pelagic fisheries

For the first time in this series of reports catches of the larger pelagic species, such as tuna and billfish, as well as sharks, are recorded under a separate sub-heading. In previous reports, catches of large pelagic fish were included in the linefish statistics.

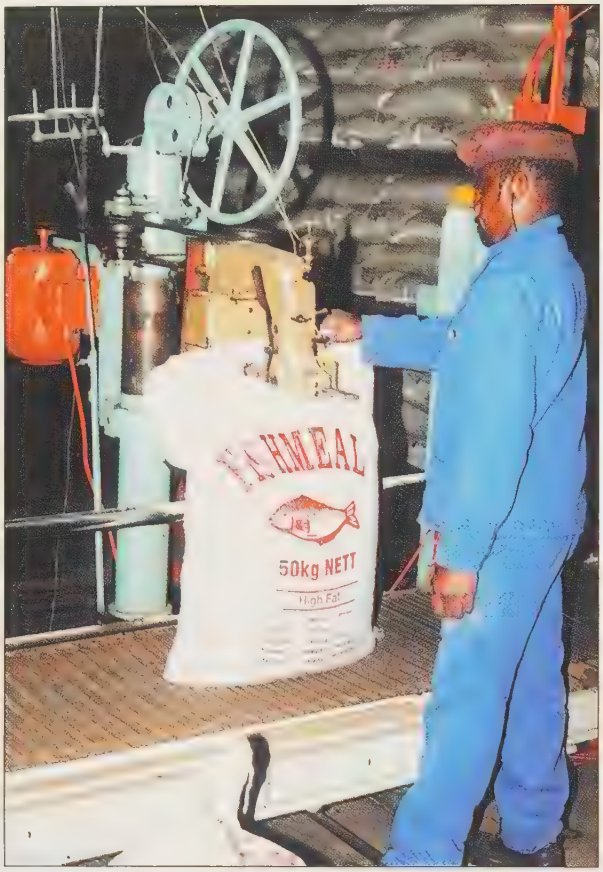
Large pelagic fish are targeted by a wide variety of fishing methods, including the pole and line method and the longline method. Sharks are generally caught by means of longline equipment and the recreational sector targets mainly tuna and billfish, using the hook and line method.

The largest South African fishery for large pelagics is the pole and line fishery which targets albacore (longfin tuna) *Thunnus alalunga*. As a signatory to the International Commission for the Conservation of Atlantic Tunas (ICCAT), South Africa is required to report on the annual catches of tunas made by South African vessels in the ICCAT area, the eastern boundary of which coincides with a line drawn due south from Agulhas Point. Catch information that was submitted to ICCAT in the past by the South African tuna fleet has been shown to be substantially incorrect and, as a result, submissions to ICCAT are now based on the export records that are maintained by the Department of Trade and Industry.

Landings of albacore increased by 19% in 1997, from the 5 634 t that were landed in 1996, to 6 708 t. The total catch of tunas in South African waters is presented in table XXIII. Limited quantities of yellowfin tuna *Thunnus albacares* (151 t) and bigeye tuna *T. obesus* (10 t) were also caught. The number of participants in this fishery fluctuates widely, owing to changing market prices and the participation by fishers in other fisheries. The fishery is seasonal and most catches are made in the warmer months, between October and March.

As a result of the interest generated by a venture to target large pelagic fish by means of the longline method, 30 experimental tuna longline permits were approved in 1997. In all, 20 permits were issued to existing operators and a further ten were issued to new entrants to the fishery. Only one of the licensed vessels was active in 1997 and it reported a swordfish catch of 37 t.

A directed longline fishery has exploited sharks since 1992. The number of permits is limited to 32 and most fishing takes place in winter. Catches consist mainly of mako shark, *Isurus oxyrinchus*, soupfin shark *Galeorhinus galeus* and blue shark *Prionace glauca*. During 1997 the fishery reported catches of 15 t, 45 t and 6 t of Mako, soupfin and blue sharks, respectively.



Fishmeal is bagged for use in animal feeds.

TABLE XXII: Total reported Cape landings (to the nearest 100kg) of linefish spec

Locality	Snoek	Yellowtail	Kob	Geelbek (silverfish)	s
Port Nolloth **					
Doring Bay					
Lamberts Bay	301 500	100			
Elands Bay	24 200				
Laaiplek **					
St Helena Bay	2 741 100	500			
Yzerfontein	2 743 600	10 900			
Table Bay Harbour **					
Hout Bay	355 200	3 000			
Kommetjie	15 200				
Kalk Bay	29 300	1 900	3 800		
Gordon's Bay	800	3 600	5 300	14 700	
Hawston **					
Hermanus		2 400	2 800	100	
Gans Bay		2 400		4 700	
Kleinbaai **					
Arniston		50 700	43 000	48 400	
Stilbay		100	156 400	2 900	
Total 1997	6 210 900	75 600	211 300	70 800	
Total 1996	6 017 920	111 533	235 410	63 117	

* Mainly baardman, blue hottentot, butterfish, flathead, fransmadam, gurnard, jac
* Did not submit harbour returns

TABLE XXIII

Commercial catches (kg) of pelagic tuna, billfish and shark species reported in the Western Cape and KwaZulu-Natal caught by line, pole and longline methods during 1996 and 1997

SPECIES	1996			1997		
	Line and Pole	Shark Longline	Tuna Longline	Line and Pole	Shark Longline	Tuna Longline
Albacore	563 4000	–	–	670 8000	–	–
Yellowfin tuna	106 978	150	–	151 000	100	–
Bigeye tuna	9 806	–	–	10 000	–	–
Skipjack tuna	821	–	–	7 000	–	–
Bluefin tuna	120	–	–	1 000	–	–
Bonito	295	–	–	2 000	–	–
Eastern little tuna	1 483	–	–	–	–	–
Unspecified tuna	–	–	–	–	–	2 790
Swordfish	78	–	–	334	410	37 450
Mako shark	*	14 627	–	*	33 577	–
Soupfin shark	*	46 387	–	*	2 015	–
Blue shark	*	6 233	–	*	11 260	–
Unspecified sharks	*	1 966	–	*	1 973	1 215
TOTAL	5 753 581	69 363	0	6 879 334	49 335	41 455

* Reported under linefish tables XX and XXII

g harbours in 1996 and 1997 (excluding tuna)

Roman, Red Dageraad, Seventy-four	Red steenbras,	Hottentot	Mackerel	Sharks	Panga	White stumpnose	Elf	Hake	Other*	Total
									0	
		8 100								8 100
		11 500							200	313 300
		1 100							1 900	27 200
										0
		600								2 742 200
		54 800		1 600						2 810 900
										0
	1100	4 100	300					31 100	1 400	434 200
		18 400							700	34 300
2 700		5 500	800		4 100	28 300	900		5 500	82 800
4 500		3 400		1 100	2 200	2 600	2 900		1 600	44 600
										0
100	100			3 500					100	23 600
			11 900	2 000						21 000
										0
31 600			1 500	49 500				1 000		239 100
6 000	100		500	45 700	100	400	300	56 500	300	275 700
44 900	1 300	107 500	15 000	103 400	6 400	31 300	4 100	88 600	11 700	7 057 000
13 972	145	111 373	514	72 571	6 003	29 180	9 609	302 900	29 940	7 135 047

klip, knifejaw, maasbanker, rock-cod, seacatfish (barbel), steentjie and wreckfish

3.12 Mullet and St Joseph

The total reported mullet *Liza richardsoni* catch decreased by 10% from the previous year to 982 t (Table XXIV), however, bycatch figures were reportedly 18% higher (Table XXV). The increase in bycatch is attributable to a fourfold increase in yellowtail *Seriola lalandi* landings in False Bay and an increase in St Joseph shark *Callorhinchus capensis* landings in the St Helena Bay area, from 76 t to 90 t.

A research project on the net fishery has shown that, although permit holders are required to submit details of their catches to fisheries authorities, the quality of these data are highly suspect. Observations of landings show that catches, and specifically bycatches, are sub-

TABLE XXIV

Geographical distribution of reported mullet catches by beach-seine and drift net permit holders for 1996 and 1997

Region	Number of permit-holders		Registered drift and beach-seine nets		Kilogram of harders caught		Percentage of catch by area	
	1996	1997	1996	1997	1996*	1997	1996	1997
Orange River to Elands Bay	75	70	85	80	51 696	56 514	4.8	5.8
Dwarskersbos to Saldanha	269	285	703	724	312 901	382 124	28.8	38.9
Saldanha Bay to Langebaan	25	27	33	39	200 999	190 819	18.5	19.4
Yzerfontein to Scarborough	34	34	35	35	156 244	48 570	14.4	4.9
Simon's Town to Kleinmond	12	12	23	23	254 707	212 680	23.5	21.7
Kleinmond to Cape Agulhas	33	35	42	43	78 769	58 392	7.3	5.9
Struis Bay to Port Elizabeth	26	24	29	27	30 686	32 691	2.8	3.3
Total	474	487	950	971	1 086 002	981 790	100	100

* Updated

TABLE XXV

Species other than harders caught in drift, beach-seine and shark gill nets for 1996 and 1997

Species	Catch (kg)	
	1996	1997
Baardman	655	918
Barbel	1 653	858
Elf	5 433	2 657
Galjoen	345	84
Geelbek	35	0
Yellowtail	12 260	50 780
Blacktail	233	93
Hottentot	348	90
Kob	3 714	3 663
Leerfish	4	55
Horse mackerel (Maasbanker)	18 405	7 022
Chub mackerel	0	0
Musselcracker	45	5
Sand steenbras	0	0
White steenbras	6 968	7 164
Springer	80	325
Steentjie	8	12
St Joseph	76 240	90 068
Stumpnose	310	1 123
Streepie	4 068	1 916
Soupfin shark	10	14
Spotted grunter	129	699
Gurnard	2 218	352
Pilchard	1 751	2 850
Snoek	2 097	953
Sole	1	0
Squid	10	211
Hake	505	262
Zebra	0	0
Spiny dogshark	9	6
Rays	10 200	2 907
Unspecified sharks	1 386	1 528
Unspecified fish	43	43
Total	149 163	176 658

stantially under-reported. Indications are that the net fishery's total catch could be anywhere between 2 000 t and 20 000 t per annum. Furthermore, the illicit fishery for galjoen *Dichistius capensis* on the West Coast has been estimated to land anything from 60 t to 150 t of galjoen every year. The most likely reason for the under-reporting of catches is that net permits are, in most cases, issued solely for the capture of mullet and St Joseph sharks and the targeting or catching of other fish, most notably linefish species, is prohibited. Net fishers are also ignorant about the importance of correctly reporting their catches and have been shown to harbour an inherent mistrust of fisheries managers.

The gross under-reporting of mullet and associated catches by net fishers, and the impact of the nets on linefish resources, needs to be addressed if this fishery is to be managed as a sustainable fishery. It is also important to ascertain what economic benefits net fishing generates for individual fishers, the local community and the national economy. There is also a need to determine what management measures or fishing methods can be improved or introduced to raise the status and ensure the future of this fishery.

3.13 Demersal fish

The largest sector of the demersal fishery is the hake-directed deep-sea trawling sector, based in Cape Town and Saldanha Bay. A much smaller inshore trawl fishery, centred in Mossel Bay on the Cape South Coast, targets hake *Merluccius capensis* and *M. paradoxus* and sole *Austroglossus pectoralis*, while a midwater trawl fishery, which targets horse mackerel *Trachurus trachurus capensis*, operates out of Cape Town.

In 1997 the demersal fishery targeted two species of hake, for which a total allowable catch of 151 000 t was set. The associated bycatch species were also an important component of the overall demersal catch. During 1996, a year of exceptionally high catch rates, the hake trawl catch was allowed to exceed the TAC in order to afford fishing companies an opportunity to make up for lost fishing time which was the result of industrial action during 1995. During 1997 hake catch rates were down from the five-year high that was recorded in 1996, and the total catch was lower than that of 1996. In 1997 the fishery was issued with a total TAC of 153 700 t. The deep-sea sector was issued with the bulk of this allowable catch, receiving 139 404 t or 92%, while the inshore fishery received 9 893 t (6,5%) and the hake longline experiment 2 700 t. A further allocation of 1 000 t was made to Moçambique, in terms of a bi-lateral fisheries agreement, and 703 t to the former Ciskei region.

The inshore trawl fishery operated under the constraints of an 872 t sole TAC, unchanged from the previous year, in conjunction with the inshore hake trawl allocation of 9 893 t. The sole catch for 1997 was slightly lower than the TAC. This was enforced in order to compensate for an over-catch during the 1996 fishing year (Table XXVI).

The horse mackerel trawl fishery was once again subject to a precautionary maximum catch limit of 58 000 t, distributed as follows: 27 894 t was allocated to 17 companies for directed mid-water trawling; 23 266 t to the deep-sea demersal trawl sector to cater for horse mackerel bycatch; 6 434 t to the inshore demersal trawl fishery to cater for bycatch and 406 t to the former

Ciskei region. All sectors reported under-catches for 1997 (Table XXVII).

The KwaZulu-Natal trawl fishery for prawns (Tugela and pink prawn) comprises only a small proportion of the total trawl catch (Table XXVI) and increased to 301 t in 1997.

3.13.1 Deep-sea trawl

The deep-sea trawl sector targets the deep-water Cape hake, *Merluccius paradoxus*, in the depth range between 200 and 800m. The shallow-water hake species, *M. capensis*, occurs between 50 and 380m and comprises a lesser proportion of the offshore sector's hake catch.

During 1997 the deep-sea trawl sector landed 167 030 t or 85% of the total trawl catch, marginally less than in 1996. (Table XXVII). Hake-directed bottom trawling remained the main objective of the fishery and the deep-sea sector accounted for 133 489 t of hake, 5% less than the 1996 catch of 140 624 t. The 1997 *cpue* estimates for the West (6.34t/day) and South Coast (0.70t/hr) fishing grounds were down from the five-year high seen in 1996. Fishing effort shifted back from the South Coast (36%) to the West Coast (64%), marking a return to the norm (as compared to 1996 when 43% was taken on the South Coast and 57% on the West Coast). The 1997 survey biomass estimate for the West Coast was the highest seen since 1989/90 while the South Coast estimate was similar to the high level of 1996.

The number of offshore trawlers (64) operational in the fishery remained unchanged over 1996. A total of 15 new quota-holders, controlling 3 772 t (2.5% of the TAC), were introduced into the deep-sea trawl fishery in 1997, while the six pioneer companies controlled 77% of the hake TAC.

Catches other than hake contributed 27% of the trawl catch in 1997 (Table XXVI), with the most abundant species being horse mackerel, monk, snoek, kingklip and ribbonfish. Horse mackerel (+10 052 t), monk (+1 501 t) and kingklip (+518 t) catches increased relative to 1996 catches while snoek (-221 t) and ribbonfish (-1 040 t) showed decreases.

Line caught hake is landed at Plettenberg Bay.

3.13.2 Inshore trawl

The south-east coast inshore trawl fishing grounds are between Cape Hangklip in the west and Port Alfred in the East. Deep-sea trawlers are excluded from working on grounds shallower than 110m in this region. Mossel Bay is the centre of the fishery but Hermanus, Gans Bay and Port Elizabeth are also important landing sites. As in 1996, a total of 33 trawlers were active in this fishery during 1997. Most vessels (64%) were between 20m and 30m long and targeted hake and bycatch species in water generally deeper than 100m. Smaller vessels (36%) targeted sole on the shallower fishing grounds (50-100m).

Hake, sole and horse mackerel, the three target species in the fishery, together accounted for 76% of the total 1997 inshore trawl catch of 15 148 t (down 8% from 1996). Hake catches in 1997 were 8 909 t, slightly lower than the inshore hake allocation of 9 893t. Sole catches in 1997 (860 t) were lower than the TAC (872 t) in order to account for the over-catch in 1996 (913 t). Horse mackerel catches (1 802 t) were higher than in 1996 (1 461 t), but still well below the inshore reserve of 6 434 t.

The annual catch rate for sole in 1997 was lower (17.8 kg.h^{-1}) than in 1996 and slightly lower than the average for the last 10 years (18.9 kg.h^{-1}). Sole catch

TABLE XXVI

Nominal (live) mass of bottom- and midwater-trawled fish, cephalopods and crustaceans landed in South Africa during 1996 and 1997

Species	1996		1997			
			West Coast	South Coast	Total	
	tons	%	tons	tons	tons	%
Cape hakes	153 686	78.48	91 391	51 663	143 054	72.44
Kingklip	3 130	1.60	1 327	2 320	3 647	1.85
Soles	925	0.47	1	859	860	0.44
Kob (Kabeljou)	154	0.08	-	134	134	0.07
Panga	624	0.32	1	767	768	0.39
Other reds	8	0.00	6	23	29	0.01
Carpenter (Silverfish)	15	0.01	-	21	21	0.01
Pomfret (Angelfish)	1 067	0.54	474	37	511	0.26
Gurnards	441	0.23	123	300	423	0.21
Jacopevers	1 183	0.60	776	294	1 070	0.54
John Dory	1 156	0.59	761	568	1 329	0.67
Horse mackerel (Maasbanker)	12 933	6.60	2 567	20 417	22 984	11.64
Skates	1 016	0.52	2	1 240	1 242	0.63
White stumpnose	18	0.01	-	29	29	0.01
Snoek	5 474	2.80	2 688	2 564	5 252	2.66
Monk	6 139	3.14	6 648	992	7 640	3.87
Sharks and St Joseph	400	0.20	10	558	568	0.29
Chub mackerel	2 993	1.53	467	4 017	4 484	2.27
Buttersnoek (Ribbonfish)	3 197	1.63	891	1 265	2 156	1.09
Southern rover (Bonnetmouth, Red mullet)	216	0.11	89	32	121	0.06
Red squid	33	0.02	45	13	58	0.03
White squid	384	0.20	6	231	237	0.12
Octopus	46	0.02	41	23	64	0.03
Other	579	0.30	358	430	788	0.40
Subtotal	195 817	100.00	108 672	88 797	197 469	100.00
Longline/line-caught hake	5 460				4 478	
West coast sole	135				4	
Total	201 412				201 951	
KwaZulu-Natal: Crustaceans	246				301	
Cephalopods	22				21	
Finfish	62				65	
Grand total	201 742				202 338	

rates are strongly influenced by weather conditions and fluctuations in annual catch rates are not necessarily a direct reflection of the health of the resource.

As for the deep-sea trawl fishery, bycatch is an important component of the inshore sector. Bycatch on the South Coast is characterised by a high diversity of species. At over 1 200 t, skate catches accounted for the highest proportion of by-catch. Significant catches of panga (768 t), sharks and St Joseph sharks (568 t) were also made. (Table XXVII).

3.13.3 Hake-directed longline experiment

A total of 2 700 t of hake was allocated to longlining during 1997, the final year of the hake longline experiment (see edition 6 for background to the longline experiment). The tuna and inshore sectors each received 1 200 t while 300 t was allocated specifically to the Eastern Cape. In addition, 2 000 t of trawl quota was transferred to longlining by the deep-sea trawl sector,

bringing the total available hake longline tonnage to 4 700 t. Catches by each of the above sectors for the year were: tuna 1 202 t; inshore 1 186 t; Eastern Cape 270 t and deep-sea 1 820 t. The total hake longline catch for 1997 was 4 478 t. Kingklip was the main bycatch species in the longline fishery and 279 t were reported (6.2%). Other bycatch species (e.g. jacopever, shark, panga and mackerel) totaled 82 t.

Effort was directed at five main grounds as follows: off Cape Point (53% of total effort); off Saldanha Bay (24%); South Coast offshore grounds between Plettenberg Bay and Port Elizabeth (22%); South Coast inshore grounds off Plettenberg Bay (4%) and off the northern West Coast (3%). The highest consistent catch rates occurred on the South Coast offshore grounds, although inclement weather conditions resulted in a decline in effort in this region during winter months. Longlines were generally set on 'hard' grounds adjacent to trawl grounds although frequent interactions between trawlers and longliners, leading to conflict and gear loss, were reported.

TABLE XXVII

Nominal (live) mass of fish landed (t) by different trawling sectors in South Africa in 1996 and 1997

Species	Deep-sea (South Coast)	Inshore trawl	Midwater	Total
Hakes	133 489	8 909	615	143 013
Kingklip	3 444	197	6	3 647
Soles	-	860	-	860
Kob (Kabeljou)	-	134	-	134
Panga	57	706	6	769
Other reds	28	-	-	28
Carpenter (Silverfish)	-	21	-	21
Pomfret (Angelfish)	511	-	-	511
Gurnards	161	261	1	423
Jacopever	1 055	10	6	1 071
John Dory	1 306	6	18	1 330
Horse mackerel (maasbanker)	9 533	1 802	11 649	22 984
Skates	2	1 239	-	1 241
White stumpnose	-	29	-	29
Snoek	5 117	53	82	5 252
Monk	7 567	64	7	7 638
Sharks and St Joseph	13	556	-	569
Chub mackerel	1729	20	2 734	4 483
Buttersnoek (Ribbonfish)	1993	10	154	2 157
Southern rover (Bonnetmouth, Red mullet)	119	-	2	121
Red squid	58	-	-	58
White squid	64	164	8	236
Octopus	62	2	-	64
Pilchard	-	-	-	
Others	722	105	3	830
Subtotal	167 030	15 148	15 291	197 469
West coast sole				4
Hake longline & handline				4 478
Total (1997)	167 030	15 148	15 291	201 951
Subtotal (1996)	170 721	16 407	8 688	195 817
West coast sole & gurnard				135
Hake longline & handline				5 460
Total (1996)				201 412

Hake-directed longlines were highly size selective for large fish and the modal size in this fishery was 75cm, compared to 35cm in the trawl fishery. The size range caught by longliners was 41-101cm whereas trawlers catch the full spectrum of hake sizes between 21 and 93cm. For the two species of hake, *Merluccius paradoxus* and *M. capensis*, the size range caught by longliners was the same. Similarly, sizes of hake caught on the South and West Coast were similar.

At low levels of longlining the impact on the spawner stock is relatively low when compared to that of trawling (which catches a far greater quantum of hake). However, when the combined effect of longlining and trawling is considered it is clear that the introduction of a commercial longline fishery, which targets only adult hake, could have a substantial impact on the spawner stock.

For both hake species, the proportion of females in catches increased with fish size, i.e. there were fewer males than females amongst the larger size classes. A similar phenomenon is observed in trawl catches, in which the sex ratio shifts from male dominance in shallow water to female dominance in deeper water.

Seal predation on hooked fish was often very severe and bird mortality was sometimes high. Most of the product was exported, fresh on ice, to Spain. Fluctuating export market prices influenced fishing seasonality. Ship-board employment was high relative to the trawling industry while land-based employment was low. Most vessels used were between 13 and 40m (average boat length = 19m). Between 2 000 and 10 000 hooks were deployed per day. Fishing trips were between three and four days in duration and an average of 8.5 t of hake was landed per trip.

3.13.4 Midwater trawl

In 1997 a total of 28 300 t was allocated to 18 companies for directed midwater trawling of horse mackerel on the South Coast. A total of 11 649 t was landed using this gear, representing a substantial increase over the 1996 figure (4 212 t), and was largely due to the introduction of a large, foreign-flagged vessel which fished under charter for several horse mackerel quota-holders. More than 50% of the total horse mackerel trawl catch (22 984 t) was taken by midwater trawling during 1997.

Due to the lack of reliable age-structured catch and *cpue* data series for this fishery it continues to be regulated according to a precautionary maximum catch limit of 58 000 t. The catch of juvenile horse mackerel taken by purse seiners on the West Coast amounted to 12 700 t. The impact of high juvenile catches on the South Coast adult stock is presently unknown and hinges largely on the natural mortality rate (M) of these juveniles: if M is high, a fishery for juveniles is unlikely to prove damaging, while if M is low, the opposite may be true.

3.13.5 West Coast sole and gurnard fisheries

No experimental permits for West Coast gurnard were issued in 1997. Two experimental sole permits were issued and a precautionary maximum catch limit of 36 t was set. Fishing was discontinued early during the year by one permit-holder due to sub-economic availability of sole off Port Nolloth. The second permit was not activated.

3.13.6 Deep water species

The Patagonian toothfish, *Dissostichus eleginoides*, is a deep-sea species found throughout large areas of the sub-Antarctic oceans, but primarily in southern parts of the Atlantic and Indian Oceans. The fish is also known as mero, Chilean sea bass and black hake. It is fished with longlines at depths of up to 2 300m in South Africa's Exclusive Economic Zone around the Prince Edward Islands in the Southern Ocean.

Six vessels were active in this fishery during 1997. A total of 13 fishing trips were made during which 1 108 t were landed, 34% less than in 1996 (1 663 t). A total of 3 617 990 hooks were deployed during the season and the catch rate (within South Africa's EEZ) was 0.306 kg/hook.

Illegal fishing by unlicensed operators continued to pose a threat to this resource, while high predation rates on hooked fish by sperm and killer whales remained a serious problem in the fishery.

In August 1996 legislation was passed in South Africa preventing the exploitation of deep-water species (oreo-dories; orange roughy; alfonsino; deep-water cardinals; Patagonian toothfish and wreckfish), unless under the authority of a deep-water permit. Two experimental deep-water trawl permits were issued for 1997 (as in 1995 and 1996), and a total of 516 t of deep-water species was landed, predominantly oreo-dories.

Resource assessments were completed for orange roughy and oreo-dories during the course of the year, based on all catches made between 1994 and February 1997. For orange roughy the assessment was based on extra-aggregation densities as no aggregations had been found. The recommended precautionary maximum catch limits for orange roughy and oreo-dories were 900 t and 2 000 t respectively, for the West Coast and the South Coast to 21°E. No exploratory fishing occurred east of 21°E. In addition, a management plan was drawn up for the fishery.